

SEQUENCE LISTING

<110> Howard A. Fields  
<110> Yury E. Khudyakov

<120> Synthetic Peptides Immunoreactive With Hepatitis A  
Virus Antibodies

<130> 14114.0342P1

<140> US/10/031,088  
<141> 2002-01-14

<150> PCT/US00/19267  
<151> 2000-07-14

<150> 60/144,412  
<151> 1999-07-15

<160> 94

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VP2 and VP4 Peptides

<400> 1  
Gly-Leu-Asp-His-Ile-Leu-Ser-Leu-Ala-Asp-Ile-Glu-Glu-Gln-Met  
1 5 10 15

Ile Gln Ser Val Gln  
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VP2 and VP4 Peptides

<400> 2  
Asp Arg Thr Ala Val Thr Gly Ala Ser Tyr Phe Thr Ser Val Asp Gln  
1 5 10 15

Ser Ser Val His Gln  
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<210> 3  
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<223> Description of Artificial Sequence: Synthetic HAV  
VP2 and VP4 Peptides

<400> 3  
Glu Val Gly Ser His Gln Val Glu Pro Leu Arg Thr Ser Val Asp Lys  
1 5 10 15  
Pro Gly Ser Lys Gln  
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<210> 4  
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VP2 and VP4 Peptides

<400> 4  
Glu Pro Leu Arg Thr Ser Val Asp Lys Pro Gly Ser Lys Lys Thr Gln  
1 5 10 15  
Gly Glu Lys Phe Gln  
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VP2 and VP4 Peptides

<400> 5  
Asp Lys Pro Gly Ser Lys Lys Thr Gln Gly Glu Lys Phe Phe Leu Ile  
1 5 10 15  
His Ser Ala Asp Gln  
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<210> 6  
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VP2 and VP4 Peptides

<400> 6  
Leu Tyr Asn Glu Gln Phe Ala Val Gln Gly Leu Leu Arg Tyr His Thr  
1 5 10 15  
Tyr Ala Arg Phe Gln  
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<210> 7  
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<220>  
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VP2 and VP4 Peptides

<400> 7  
His Thr Tyr Ala Arg Phe Gly Ile Glu Ile Gln Val Gln Ile Asn Pro  
1 5 10 15

Thr Pro Phe Gln  
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<210> 8  
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VP2 and VP4 Peptides

<400> 8  
Ile Asn Pro Thr Pro Phe Gln Gln Gly Gly Leu Ile Cys Ala Met Val  
1 5 10 15

Pro Gly Asp Gln  
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<210> 9  
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<223> Description of Artificial Sequence: Synthetic HAV  
VP2 and VP4 Peptides

<400> 9  
His Phe Lys Asp Pro Gln .Tyr Pro Val Trp Glu Leu Thr Ile Arg Val  
1 5 10 15

Trp Ser Glu Leu Gln  
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VP2 and VP4 Peptides

<400> 10  
Asn Ile Gly Thr Gly Thr Ser Ala Tyr Thr Ser Leu Asn Val Leu Ala  
1 5 10 15

Arg Phe Thr Asp Gln  
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VP3 Peptide

<400> 11  
Ser Asp Pro Ser Gln Gly Gly Ile Lys Ile Thr His Phe Thr Thr  
1 5 10 15

Trp Thr Ser Ile Gln  
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<210> 12  
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VP3 Peptide

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Gly Gly Ile Lys Ile Thr His Phe Thr Thr Trp Thr Ser Ile Pro Thr  
1 5 10 15

Leu Ala Ala Gln  
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<210> 13  
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VP3 Peptide

<400> 13  
Gln Phe Pro Phe Asn Ala Ser Asp Ser Val Gly Gln Gln Ile Lys Val  
1 5 10 15

Ile Pro Val Asp Gln  
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VP3 Peptide

<400> 14  
Phe Asn Ala Ser Asp Ser Val Gly Gln Ile Lys Val Ile Pro Val  
1 5 10 15  
Asp Pro Tyr Phe Gln  
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VP3 Peptide

<400> 15  
Ser Asp Ser Val Gly Gln Ile Lys Val Ile Pro Val Asp Pro Tyr  
1 5 10 15  
Phe Phe Gln Met Gln  
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VP3 Peptide

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Ile Lys Val Ile Pro Val Asp Pro Tyr Phe Phe Gln Met Thr Asn Thr  
1 5 10 15  
Asn Pro Asp Gln Gln  
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VP3 Peptide

<400> 17  
Lys Cys Ile Thr Ala Leu Ala Ser Ile Cys Gln Met Phe Cys Phe Trp  
1 5 10 15  
Arg Gly Asp Leu Gln  
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<210> 18  
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VP3 Peptide

<400> 18  
Phe Trp Arg Gly Asp Leu Val Phe Asp Phe Gln Val Phe Pro Thr Lys  
1 5 10 15  
Tyr His Ser Gly Gln  
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<210> 19  
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VP3 Peptide

<400> 19  
Phe Asp Phe Gln Val Phe Pro Thr Lys Tyr His Ser Gly Arg Leu Leu  
1 5 10 15  
Phe Cys Phe Val Gln  
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<210> 20  
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<212> PRT  
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VP3 Peptide

<400> 20  
Phe Pro Thr Lys Tyr His Ser Gly Arg Leu Leu Phe Cys Phe Val Pro  
1 5 10 15  
Gly Asn Glu Leu Gln  
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<210> 21  
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<212> PRT  
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<223> Description of Artificial Sequence: Synthetic HAV  
VP3 Peptide

<400> 21  
Gly Ile Thr Leu Lys Gln Ala Thr Thr Ala Pro Cys Ala Val Met Asp  
1 5 10 15  
Ile Thr Gly Val Gln  
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<210> 22  
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VP3 Peptide

<400> 22  
Val Ala Ser His Val Arg Val Asn Val Tyr Leu Ser Ala Ile Asn Leu  
1 5 10 15  
Glu Cys Phe Ala Gln  
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<210> 23  
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VP1 Peptide

<400> 23  
Thr Thr Val Ser Thr Glu Gln Asn Val Pro Asp Pro Gln Val Gly Ile  
1 5 10 15  
Thr Thr Met Lys Gln  
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VP1 Peptide

<400> 24  
Gln Asn Val Pro Asp Pro Gln Val Gly Ile Thr Thr Met Lys Asp Leu  
1 5 10 15

Lys Gly Lys Ala Gln  
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VP1 Peptide.

<400> 25  
Asn Arg Gly Lys Met Asp Val Ser Gly Val Gln Ala Pro Val Gly Ala  
1 5 10 15

Ile Thr Thr Ile Gln  
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<210> 26  
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VP1 Peptide

<400> 26  
Ile Thr Thr Ile Glu Asp Pro Val Leu Ala Lys Lys Val Pro Glu Thr  
1 5 10 15

Phe Pro Glu Leu Gln  
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<210> 27  
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VP1 Peptide

<400> 27  
Glu Asp Pro Val Leu Ala Lys Lys Val Pro Glu Thr Phe Pro Glu Leu  
1 5 10 15

Lys Pro Gly Glu Gln  
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VP1 Peptide

<400> 28  
Ala Lys Lys Val Pro Glu Thr Phe Pro Glu Leu Lys Pro Gly Glu Ser  
1 5 10 15  
Arg His Thr Ser Gln  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
VP1 Peptide

<400> 29  
Phe Pro Glu Leu Lys Pro Gly Glu Ser Arg His Thr Ser Asp His Met  
1 5 10 15  
Ser Ile Tyr Lys Gln  
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<210> 30  
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VP1 Peptide

<400> 30  
Asp His Met Ser Ile Tyr Lys Phe Met Gly Arg Ser His Phe Leu Cys  
1 5 10 15  
Thr Phe Thr Phe Gln  
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VP1 Peptide

<400> 31  
His Phe Leu Cys Thr Phe Thr Phe Asn Ser Asn Asn Lys Glu Tyr Thr  
1 5 10 15  
Phe Pro Ile Thr Gln  
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VP1 Peptide

<400> 32  
Thr Pro Val Gly Leu Ala Val Asp Thr Pro Trp Val Glu Lys Glu Ser  
1 5 10 15  
Ala Leu Ser Ile Gln  
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VP1 Peptide

<400> 33  
Leu Ser Phe Ser Cys Tyr Leu Ser Val Thr Glu Gln Ser Glu Phe Tyr  
1 5 10 15  
Phe Pro Arg Ala Gln  
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<210> 34  
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VP1 Peptide

<400> 34  
Ser Val Thr Glu Gln Ser Glu Phe Tyr Phe Pro Arg Ala Pro Leu Asn  
1 5 10 15  
Ser Asn Ala Met Gln  
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VP1 Peptide

<400> 35  
Pro Leu Asn Ser Asn Ala Met Leu Ser Thr Glu Ser Met Met Ser Arg  
1 5 10 15

Ile Ala Ala Gly Gln  
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VP1 Peptide

<400> 36  
Met Ser Arg Ile Ala Ala Gly Asp Leu Glu Ser Ser Val Asp Asp Pro  
1 5 10 15

Arg Ser Glu Glu Gln  
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<210> 37  
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VP1 Peptide

<400> 37  
Ala Gly Asp Leu Glu Ser Ser Val Asp Asp Pro Arg Ser Glu Glu Asp  
1 5 10 15

Lys Arg Phe Glu Gln  
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<210> 38  
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VP1 Peptide

<400> 38  
Val Asp Asp Pro Arg Ser Glu Glu Asp Lys Arg Phe Glu Ser His Ile  
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Glu Cys Arg Lys Gln  
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<210> 39  
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P2A Peptide

<400> 39  
Ser His Ile Glu Cys Arg Lys Pro Tyr Lys Glu Leu Arg Leu Glu Val  
1 5 10 15

Gly Lys Gln Arg Gln  
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<210> 40  
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P2A Peptide

<400> 40  
Pro Tyr Lys Glu Leu Arg Leu Glu Val Gly Lys Gln Arg Leu Lys Tyr  
1 5 10 15

Ala Gln Glu Glu Gln  
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<210> 41  
<211> 21  
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P2A Peptide

<400> 41  
Gln Arg Leu Lys Tyr Ala Gln Glu Glu Leu Ser Asn Glu Val Leu Pro  
1 5 10 15

Pro Pro Arg Lys Gln  
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<210> 42  
<211> 21  
<212> PRT  
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<223> Description of Artificial Sequence: Synthetic HAV  
P2A Peptide

<400> 42  
Val Leu Pro Pro Pro Arg Lys Met Lys Gly Leu Phe Ser Gln Ala Lys  
1 5 10 15

Ile Ser Leu Phe Gln  
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<210> 43  
<211> 21  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P2A Peptide

<400> 43  
Phe Ser Gln Ala Lys Ile Ser Leu Phe Tyr Thr Glu Glu His Glu Ile  
1 5 10 15

Met Lys Phe Ser Gln  
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<210> 44  
<211> 21  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P2A Peptide

<400> 44  
Lys Val Asn Phe Pro His Gly Met Leu Asp Leu Glu Glu Ile Ala Ala  
1 5 10 15

Asn Ser Lys Asp Gln  
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<210> 45  
<211> 21  
<212> PRT  
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<220>  
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P2A Peptide

<400> 45  
Asp Leu Glu Glu Ile Ala Ala Asn Ser Lys Asp Phe Pro Asn Met Ser  
1 5 10 15

Glu Thr Asp Leu Gln  
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<210> 46  
<211> 20  
<212> PRT  
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<223> Description of Artificial Sequence: Synthetic HAV  
P2A Peptide

<400> 46  
Lys Ile Asn Leu Ala Asp Arg Met Leu Gly Leu Ser Gly Val Gln Glu  
1 5 10 15  
Ile Lys Glu Gln  
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<210> 47  
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<223> Description of Artificial Sequence: Synthetic HAV  
P2A Peptide

<400> 47  
Gln Arg Leu Lys Tyr Ala Gln Glu Glu Leu Ser Asn Glu Val Leu Pro  
1 5 10 15  
Pro Pro Arg Lys Met Lys Gly Leu Phe Gln  
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<210> 48  
<211> 25  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P2A Peptide

<400> 48  
Trp Leu Asn Pro Lys Lys Ile Asn Leu Ala Asp Arg Met Leu Gly Leu  
1 5 10 15  
Ser Gly Val Gln Glu Ile Lys Glu Gln  
20 25

<210> 49  
<211> 21  
<212> PRT  
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P2B Peptide

<400> 49  
Val Ile Gln Gln Leu Asn Gln Asp Glu His Ser His Ile Ile Gly Leu  
1 5 10 15  
Leu Arg Val Met Gln  
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<210> 50  
<211> 21  
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P2C Peptide

<400> 50  
Asn Ile Leu Lys Asp Asn Gln Gln Lys Ile Glu Lys Ala Ile Glu Glu  
1 5 10 15  
Ala Asp Glu Phe Gln  
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<210> 51  
<211> 21  
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P2C Peptide

<400> 51  
Leu Gly Ser Ile Asn Gln Ala Met Val Thr Arg Cys Glu Pro Val Val  
1 5 10 15  
Cys Tyr Leu Tyr Gln  
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<210> 52  
<211> 21  
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P2C Peptide

<400> 52  
Arg Cys Glu Pro Val Val Cys Tyr Leu Tyr Gly Lys Arg Gly Gly  
1 5 10 15  
Lys Ser Leu Thr Gln  
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<210> 53  
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P2C Peptide

<400> 53  
Thr Lys Pro Val Ala Ser Asp Tyr Trp Asp Gly Tyr Ser Gly Gln Leu  
1 5 10 15  
Val Cys Ile Ile Gln  
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<210> 54  
<211> 21  
<212> PRT  
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<220>  
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P2C Peptide

<400> 54  
Val Ser Gly Cys Pro Met Arg Leu Asn Met Ala Ser Leu Glu Glu Lys  
1 5 10 15  
Gly Arg His Phe Gln  
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<210> 55  
<211> 21  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P2C Peptide

<400> 55  
Leu Asn Met Ala Ser Leu Glu Glu Lys Gly Arg His Phe Ser Ser Pro  
1 5 10 15  
Phe Ile Ile Ala Gln  
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<210> 56  
<211> 21  
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P2C Peptide

<400> 56  
Asn Pro Ser Pro Lys Thr Val Tyr Val Lys Glu Ala Ile Asp Arg Arg  
1 5 10 15  
Leu His Phe Lys Gln  
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<210> 57  
<211> 21  
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P2C Peptide

<400> 57  
Val Lys Glu Ala Ile Asp Arg Arg Leu His Phe Lys Val Glu Val Lys  
1 5 10 15  
Pro Ala Ser Phe Gln  
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<210> 58  
<211> 21  
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P2C Peptide

<400> 58  
Val Lys Pro Ala Ser Phe Phe Lys Asn Pro His Asn Asp Met Leu Asn  
1 5 10 15  
Val Asn Leu Ala Gln  
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<210> 59  
<211> 21  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P2C Peptide

<400> 59  
Lys Asn Pro His Asn Asp Met Leu Asn Val Asn Leu Ala Lys Thr Asn  
1 5 10 15  
Asp Ala Ile Lys Gln  
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<210> 60  
<211> 21  
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<220>  
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P2C Peptide

<400> 60  
Leu Ala Lys Thr Asn Asp Ala Ile Lys Asp Met Ser Cys Val Asp Leu  
1 5 10 15  
Ile Met Asp Gly Gln  
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<210> 61  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P2C Peptide

<400> 61  
Val Met Thr Val Glu Ile Arg Lys Gln Asn Met Thr Glu Phe Met Glu  
1 5 10 15  
Leu Trp Ser Gln  
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<210> 62  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3A Peptide

<400> 62  
Ser Gln Gly Ile Ser Asp Asp Asp Asn Asp Ser Ala Val Ala Glu Phe  
1 5 10 15  
Phe Gln Ser Phe Gln  
20

<210> 63  
<211> 21  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3A Peptide

<400> 63  
Asp Ser Ala Val Ala Glu Phe Phe Gln Ser Phe Pro Ser Gly Glu Pro  
1 5 10 15  
Ser Asn Ser Lys Gln  
20

<210> 64  
<211> 21  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3A Peptide

<400> 64  
Phe Gln Ser Phe Pro Ser Gly Glu Pro Ser Asn Ser Lys Leu Ser Gly  
1 5 10 15  
Phe Phe Gln Ser Gln  
20

<210> 65  
<211> 25  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3A Peptide

<400> 65  
Ser Ala Val Ala Glu Phe Phe Gln Ser Phe Pro Ser Gly Glu Pro Ser  
1 5 10 15  
Asn Ser Lys Leu Ser Gly Phe Phe Gln  
20 25

<210> 66  
<211> 20  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3B Peptide

<400> 66  
His Gly Val Thr Lys Pro Lys Gln Val Ile Lys Leu Asp Ala Asp Pro  
1 5 10 15  
Val Glu Ser Gln  
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<210> 67  
<211> 21  
<212> PRT  
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<220>  
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P3C Peptide

<400> 67  
Gly Leu Val Arg Lys Asn Leu Val Gln Phe Gly Val Gly Glu Lys Asn  
1 5 10 15  
Gly Cys Val Arg Gln  
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<210> 68  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3C Peptide

<400> 68  
Asp Val Val Leu Met Lys Val Pro Thr Ile Pro Lys Phe Arg Asp Ile  
15  
1  
Thr Gln His Phe Gln  
20

<210> 69  
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<220>  
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P3C Peptide

<400> 69  
Met Glu Glu Lys Ala Thr Tyr Val His Lys Lys Asn Asp Gly Thr Thr  
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Val Asp Leu Thr Gln  
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--<210> 70  
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<223> Description of Artificial Sequence: Synthetic HAV  
P3C Peptide

<400> 70  
Lys Asn Asp Gly Thr Thr Val Asp Leu Thr Val Asp Gln Ala Trp Arg  
15  
1  
Gly Lys Gly Glu Gln  
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<210> 71  
<211> 20  
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<223> Description of Artificial Sequence: Synthetic HAV  
P3C Peptide

<400> 71  
Arg Gly Lys Gly Glu Gly Leu Pro Gly Met Cys Gly Gly Ala Leu Val  
1 5 10 15

Ser Ser Asn Gln  
20

<210> 72  
<211> 20  
<212> PRT  
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P3C Peptide

<400> 72  
Val Ala Lys Leu Val Thr Gln Glu Met Phe Gln Asn Ile Asp Lys Lys  
1 5 10 15

Ile Glu Ser Gln  
20

<210> 73  
<211> 21  
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P3D Peptide

<400> 73  
Arg Ile Met Lys Val Glu Phe Thr Gln Cys Ser Met Asn Val Val Ser  
1 5 10 15

Lys Thr Leu Phe Gln  
20

<210> 74  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 74  
Phe Thr Gln Cys Ser Met Asn Val Val Ser Lys Thr Leu Phe Arg Lys  
1 5 10 15

Ser Pro Ile Tyr Gln  
20

<210> 75  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 75  
Met Leu Ser Lys Tyr Ser Leu Pro Ile Val Glu Glu Pro Glu Asp Tyr  
1 5 10 15  
Lys Glu Ala Ser Gln  
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<210> 76  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 76  
Leu Asp Glu Asn Gly Leu Leu Leu Gly Val His Pro Arg Leu Ala Gln  
1 5 10 15  
Arg Ile Leu Phe Gln  
20

<210> 77  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 77  
Cys Pro Lys Asp Glu Leu Arg Pro Leu Glu Lys Val Leu Glu Ser Lys  
1 5 10 15  
Thr Arg Ala Ile Gln  
20

<210> 78  
<211> 21

<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 78  
Ser Lys Thr Arg Ala Ile Asp Ala Cys Pro Leu Asp Tyr Ser Ile Leu  
1 5 10 15  
Cys Arg Met Tyr Gln  
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<210> 79  
<211> 21  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 79  
Arg Met Tyr Trp Gly Pro Ala Ile Ser Tyr Phe His Leu Asn Pro Gly  
1 5 10 15  
Phe His Thr Gly Gln  
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<210> 80  
<211> 21  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 80  
Lys Thr Met Ile Arg Phe Gly Asp Val Gly Leu Asp Leu Asp Phe Ser  
1 5 10 15  
Ala Phe Asp Ala Gln  
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<210> 81  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 81  
Asp Leu Asp Phe Ser Ala Phe Asp Ala Ser Leu Ser Pro Phe Met Ile  
1 5 10 15  
Arg Glu Ala Gly Gln  
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<210> 82  
<211> 21  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 82  
Ile Asn Asn Val Asn Leu Tyr Tyr Val Phe Ser Lys Ile Phe Gly Lys  
1 5 10 15

Ser Pro Val Phe Gln  
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<210> 83

<211> 21

<212> PRT

<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 83  
Gly Gln Lys Ile Val Asp Glu Phe Lys Lys Leu Gly Met Thr Ala Thr  
1 5 10 15

Ser Ala Asp Lys Gln  
20

<210> 84

<211> 21

<212> PRT

<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 84  
Leu Gly Met Thr Ala Thr Ser Ala Asp Lys Asn Val Pro Gln Leu Lys  
1 5 10 15

Pro Val Ser Glu Gln  
20

<210> 85

<211> 21

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic HAV  
P3D Peptide

<400> 85  
Pro Gln Leu Lys Pro Val Ser Glu Leu Thr Phe Leu Lys Arg Ser Phe  
1 5 10 15

Asn Leu Val Glu Gln  
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<210> 86

<211> 20

<212> PRT

<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Synthetic HAV  
P3D Peptide

<400> 86  
Ser Glu Lys Thr Ile Trp Ser Leu Ile Ala Trp Gln Arg Ser Asn Ala  
1 5 10 15  
Glu Phe Glu Gln  
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<210> 87  
<211> 20  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Synthetic HAV  
P3D Peptide

<400> 87  
Ser Leu Ile Ala Trp Gln Arg Ser Asn Ala Glu Phe Glu Gln Asn Leu  
1 5 10 15  
Glu Asn Ala Gln  
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<210> 88  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Synthetic HAV  
P3D Peptide

<400> 88  
Trp Gln Arg Ser Asn Ala Glu Phe Glu Gln Asn Leu Glu Asn Ala Gln  
1 5 10 15  
Trp Phe Ala Phe Gln  
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<210> 89  
<211> 20  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence:Synthetic  
Peptide

<400> 89  
Ala  
1 5 10 15  
Ala Ala Ala Ala  
20

<210> 90  
<211> 21  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic  
Peptide

<400> 90  
Ala  
1 5 10 15  
Ala Ala Ala Ala Gln  
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<210> 91  
<211> 20  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
Peptide

<400> 91  
Gly  
1 5 10 15  
Gly Gly Gly Gly  
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<210> 92  
<211> 21  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic  
Peptide

<400> 92  
Gly  
1 5 10 15  
Gly Gly Gly Gly Gln  
20

<210> 93  
<211> 20  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
Peptide

<400> 93  
Gly Gly Gly Gly Ala Ala Ala Ala Gly Gly Gly Gly Ala  
1 5 10 15  
Ala Ala Ala Ala  
20

<210> 94  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
Peptide

<400> 94  
Gly Gly Gly Gly Ala Ala Ala Ala Gly Gly Gly Gly Ala  
1 5 10 15  
Ala Ala Ala Ala Gln  
20